

REMARKS/ARGUMENTS

Applicant gratefully acknowledges Examiner's allowance of Claim 9. Claims 1 – 8 are still pending in the application.

In an Office Action dated 18 June 2004, the Examiner rejected Claims 1 – 3, 6, and 7 under 35 U.S.C. § 102(e) as being anticipated by Romesburg (U.S. Pat. No. 6,507,653). In addition, the Examiner objected to Claims 4, 5, and 8 as "being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims." This rejection is respectfully traversed.

With regards to Claims 1 – 3, 6, and 7, the Examiner noted:

2. Regarding **claim 1**, Romesburg discloses echo suppression. In addition, Romesburg discloses a gain control method for acoustic cancellation and suppression for use with a full duplex voice terminal having an adaptive filter, a speaker, and a microphone, the method comprising: playing the far-end signal at the speaker; receiving an echo signal that is acoustically coupled from the speaker to the microphone, wherein the echo signal is a portion of the far-end signal played at the speaker; filtering the far-end signal by the adaptive filter to generate a filtered signal; calculating an error signal, wherein the error signal is the difference between the echo signal minus the filtered signal; calculating the attenuation factor from the far-end signal, the filtered signal, and the error, wherein the attenuation factor is between a predetermined upper limit and a predetermined lower limit; and calculating the transmit signal, wherein the transmit signal is the product of the attenuation factor times the error signal, as disclosed at column 7, line 1 through column 8, line 14 and exhibited in figure 2B.

Regarding **claim 2**, Romesburg discloses everything claimed as applied above (see claim 1), in addition Romesburg discloses receiving an analog echo signal from the microphone; digitizing the analog echo signal at a predetermined rate of samples per second, wherein the rate of samples for second is the same rate of samples per second as the received far end signal column 7, lines 1-55 and exhibited in figure 2B.

Regarding **claim 3**, Romesburg discloses everything claimed as applied above (see claim 1), in addition Romesburg discloses calculating a suppression value from the far end signal, the filtered, the error signal and a predetermined silence value; and deriving the attenuation factor from the smoothed suppression value, wherein the attenuation factor is between the predetermined upper limit and the predetermined lower limit, as disclosed at column 10, line 32 through column 112, line 45 and exhibited in figure 4.

Regarding **claims 6 and 7**, Romesburg discloses everything claimed, in addition claims 6 and 7 are interpreted and thus rejected for the reasons

set forth above in the rejection of claims 1-3.

Applicant has reviewed the cited Romesburg patent and notes that there is not even a hint of an attenuation method that computes the attenuation level for suppressing an echo containing signal based on the far-end signal, the filtered signal, and the error signal within a gain control method for acoustic echo cancellation and suppression for use with a full duplex voice terminal. On the contrary, the Romesburg patent teaches a method that computes the energy contained in signals y (Energy_y) and u (Energy_u), followed by estimating the noise components Noise_u and Noise_y , respectively, for energy signals Energy_u and Energy_y (see column 11, lines 1 – 3). The Romesburg patent teaches determining a first noise ratio based on $\text{Voice}_u/\text{Voice}_y$ that is compared to a first threshold value and determining a second noise ratio based on $\text{Voice}_u/\text{Noise}_u$ that is compared to a second threshold value. If both of these ratios exceed their respective threshold values, then NLP 146 is switched into desired-voice mode (near-end voice mode). If both of these ratios do not exceed their threshold values, then the NLP 146 is switched into the echo voice mode (far-end voice mode) (see column 11, lines 7 – 23; and Figure 4). Further, the Romesburg patent states that “[b]y basing desired-voice detection on an energy comparison between echo-containing signal u and estimated-echo signal y , the present invention’s NLP mode control is relatively insensitive to the echo-cancellation effectiveness of LEC 144. Thus, NLP mode control is not as prone as prior-art systems to NLP-mode control errors caused by echo-path changes.” (see column 9, lines 57 – 63).

The Romesburg patent teaches deriving an estimated-echo signal y based on the processed speech signal x at LEC 144. Then the estimated-echo signal y is subtracted from the echo-containing signal u to produce an error signal e . These operations are performed during the canceling portion of Romesburg’s echo control method. These operations are not part of the suppression operations described above (see column 10, line 65 through column 11, line 1; and Figure 4). The suppression operations performed by Romesburg involve calculations based on the echo-containing signal u and estimated-echo signal y as described above (see blocks 406 through 424 of Figure 4). Conversely, Applicant’s present gain control method provides the “amount of attenuation added by the echo suppression stage is dependent of the echo cancellation stage since the echo

cancellation variable $x[n]$, $y[n]$, and $e[n]$ are all used to calculate the attenuation factor k used to attenuate error signal $e[n]$ to produce transmit signal $t[n]$ (see page 14, lines 15 – 18).

The Romesburg patent teaches using signals u (echo-containing signal) and y (estimated echo signal) to calculate an attenuation factor; however, Applicant has clearly expressed in Claim 1 that the attenuation factor is calculated from the far-end signal, the filtered signal, and the error signal. Thus, the Romesburg patent teaches only one of the three inputs for the attenuation calculation as described and claimed in the present gain control method for acoustic echo cancellation and suppression for use with a full duplex voice terminal. Therefore, Applicant submits that Claim 1 is allowable under 35 U.S.C. §102(e), since there is no support for the limitation “calculating an attenuation factor from the far-end signal, the filtered signal, and the error signal, wherein the attenuation factor is between a predetermined upper limit and a predetermined limit;” in the specification. Applicant has amended Claim 1 to correct a typographical error.

Regarding the Examiner's rejection of Claims 2 – 5, they depend on Claim 1 and include all its limitations; therefore, they are also allowable because they are dependent upon an allowable Claim 1.

Regarding the Examiner's rejection of Claims 6 – 8, the Romesburg patent does not even hint of a method for calculating an attenuation factor based on processing the far-end signal, the filtered signal, and the error signal to compute a far-end power, a filtered power, and an error power for use with a full duplex voice terminal. Moreover, the Romesburg patent, does not even hint at “calculating a suppression value as the sum of a weighted difference between a predetermined silence power minus the far-end power plus a weighted difference between the error power minus the filtered power; converting the suppression value to a linear value; determining the attenuation factor between an upper limit and a lower limit, wherein the attenuation factor is the upper limit when the linear value is greater than the upper limit, is the lower limit when the linear value is less than the lower limit and it the linear value when the linear value is between the upper limit and the lower limit.” (see Applicant's Claim 1). All of these limitations are missing from the Romesburg patent; thus, it does not anticipate Claim 6 of the present application. Regarding Claims 7

and 8, since they depend on Claim 6 and include all its limitations, they are also allowable because they are dependent upon an allowable Claim 6.

Applicant respectfully requests a Notice of Allowance of claims 1 – 9 in this application in light of the amendments and remarks set forth herein. The undersigned attorney requests Examiner Harold to telephone if a conversation could expedite the prosecution of this application. Applicants authorize the Commissioner to charge any required payment of fees to Deposit Account No. 50-1848.

Respectfully submitted,
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Appl. No. 10/035,617
Amtd. Dated 15 Sep. 2004
Reply to Office Action of 18 June 2004
Annotated Sheet Showing Changes

